

**REMARKS**

Claims 1-22 are all the claims pending in the application. Additionally, new claims 23-25 are added. For at least the reasons herein, Applicant respectfully requests withdrawal of the rejections, and allowance of the claims.

**I. Claim Amendments**

Applicant has rewritten allowable claims 15, 12, and 18 in independent form to include the features and limitations of base claims 1, 5, and 7, respectively. Claims 4 and 8 have been rewritten in dependent form to depend from the new independent claims 15 and 12, and thus include allowable subject matter. Additionally, independent claims 1 and 5 have been modified to include explicitly subject matter that was apparent from the prior recitations, and in conjunction with this change, claims 2, 6, and 20 have been amended. Also, independent claims 3 and 7 are rewritten in dependent form to depend from the new independent claims 1 and 5, respectively. As amended, the claims describe relative pulse widths based on bit order that is not taught or suggested by the art of record.

The amendments made to the existing claims are not believed to be narrowing, and therefore raise no new issues requiring further search. In particular, the above claim modifications should be entered because the width of a subordination bit and superordination bit now describe explicitly what would be apparent from the original claim recitation.

**II. EVEN IF CLAIM MODIFICATIONS ARE NOT ENTERED, CLAIMS IN THEIR PENDING FORM ARE PATENTABLE OVER THE PRIOR ART FOR THE FOLLOWING REASONS**

Applicant respectfully requests the Examiner to take notice that even if the claim modifications are not entered, the claims in their pending form should be allowable for the following reasons presented in the arguments found immediately below.

**III. Claim Rejections**

**A. Rejections under §102.**

**Inui.** Claims 1-11 and 20 stand rejected due to alleged anticipation under 35 U.S.C. § 102(b) over Inui et al. (U.S. Patent No. 5,363,125, hereafter “Inui”). Applicant respectfully submits that Inui fails to disclose all of the claimed features, as required for an anticipation rejection under §102. Thus, Applicant respectfully requests the withdrawal of the rejections.

The Examiner continues to rely on the Abstract, Figure 2, and Columns 2 and 6 of Inui to support the rejection under 35 U.S.C. § 102(b). Though the Examiner has acknowledged prior arguments relative to the use of varying pulse widths for bits at superordinal and subordinal positions, the Examiner has failed to rebut any arguments of record. Therefore, Applicant would continue to emphasize that the width of pulses in Inui is not attributable to the position of the bit (superordinal or subordinal). Rather, in Inui, the width of a pulse is based on the position of a pixel, such as whether the pixel is formed at the edge of an image, requiring thermal head pre-heating or at a central portion of an image, such that little or no pre-heating is necessary.

The Examiner has also failed to show that the variation in pulse width is inherently tied to a bit order. Inui contemplates 5 tonal shades (including 0) using 4 pulses (and a 000 condition) (*see* col.3, ln.40-50, Inui). This would, at a minimum, suggest that the bit representation (a one-to-one correspondence) merely corresponds to prior art. Additionally, it appears that at level 01h in Inui, the first sub-line becomes printed. This corresponds to a 001 bit representation, leaving a pulse width of the last bit (subordinal bit) having a longer pulse width. This does not correspond to the claims. Inui is, at best, ambiguous on the bit representation as they correspond to pulse width. This is because the bit order is of no concern. Rather, the pixel order is of relevance in the art. The Examiner's confusion of pixel and bit is clear from the face of the rebuttal. Therefore, independent claims 1 and 5 are not anticipated and their dependent claims are also patentable.

The prior art as taught by Inui does not disclose an image recording method having activation or non-activation operation for each of said pulses, related to a specified bit forming image data, as recited in claims 3 and 7. According to Inui, the width of each drive pulse is controlled with respect to the position of the corresponding pixel and the corresponding sub-line position in the pixel as discussed in column 3, lines 13 - 20. The pulse widths are not related to a specified bit as claimed. As discussed above, the bit representation of Inui is ambiguous and since the pulse drive can be related to a pre-stored table in view of the small number of tone levels, the bit aspect of claims 3 and 7 is not inherent in Inui. Claim 20 is not anticipated on similar grounds. The claimed invention accounts for each pulse and supplies an activation or non-activation operation for pulses as related to a bit. This feature clearly distinguishes the

claimed invention from the prior art taught in Inui. Therefore, claims 3 and 7 should not be rejected because they are not anticipated by Inui. Further, Applicant argues that the dependent claims are allowable for the same reasons as the independent claims from which they depend.

**B. Rejections under §103.**

**Inui in view of Kurachi.** Claims 19, 21, and 22 are rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Inui in view of Kurachi (U.S. Patent No. 6,222,572 B1, hereafter “Kurachi”). Kurachi relates to a thermal recording apparatus which performs recording pixels each having a predetermined density by selectively driving a plurality of heating-elements mounted on a thermal head.

The Examiner contends that dependent claims 19, 21 and 22 are suggested by the combination of Inui and Kurachi. The Examiner correctly concedes that Inui fails to teach thermal patterns made to be different between neighboring pixels and lines of image data and a gradation of N levels expressed using fewer than N-1 pulses. The Examiner cites Kurachi to make up for the above deficiency. The Examiner’s rejection is not supported for at least the following reasons.

Significantly, Inui and Kurachi teach away from their combination with each other in a fundamental manner. Inui seeks to address the problem of insufficient heating of thermal printing elements at the onset of printing, thereby providing a pre-heating pulse based on pixel position. By contrast, Kurachi teaches the reduction of the influence of heat accumulation of each heating-element thus enabling the printing of minute dots (*see* col. 10, ln. 17-21, Kurachi). The references are concerned with opposite thermal effects and thus approach printing in a

fundamentally different way. Moreover, Kurachi specifically contemplates a certain random pattern of dot formation to provide a smooth gradation image. By contrast, Inui routinely prints a first sub-line at higher gradation to achieve its effect. The pattern formations of each reference fundamentally differ to achieve fundamentally different effects. One in combination with the other would lead to undermining the principle of operation of each reference. Therefore, the references may not be combined.

#### **IV. New Claims**

As shown in the foregoing amendments, Applicant has added new claims 23-25 to depend from the new independent claims 18,12, and 15. Applicant respectfully submits that new claims 23-25 are allowable, and thus requests allowance thereof.

AMENDMENT UNDER 37 C.F.R. § 1.116  
U.S. Appln. No. 09/988,669

**V. Conclusion**

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

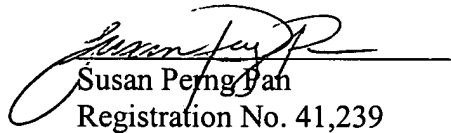
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